Supporting factors for labor productivity in Indonesia

Muhammad Amir Arham*; Fitri Hadi Yulia Akib

Department of Development Economics, Faculty of Economics, Universitas Negeri Gorontalo, Indonesia

*To whom correspondence should be addressed: email: muhammad.arham@ung.ac.id

DOI:	Received:	Revised:	Accepted:	Published:
10.22437/ppd.v10i5.14447	20.08.2021	11.12.2022	14.12.2022	31.12.2022

Abstract

Indonesia's investment attractiveness is still weak compared to other ASEAN countries; one of the reasons is the low labor productivity. On this basis, this study aims to find out what factors are dominantly driving labor productivity in Indonesia statistically, as well as the right policy model to encourage labor productivity, bringing Indonesia a high-income country. The analytical method used in this study is panel data regression analysis, 2014 - 2018 period, covering 34 provinces in Indonesia. The study suggests that fiscal policy through general allocation fund (DAU) or transfers signifies increasing labor productivity, while special allocation fund (DAK) does not. Economic factors such as labor costs, the contribution of the agricultural sector, and economic openness can increase labor productivity, while industrial sector share has no effect. Social factors measured by the education level of general secondary schools and life expectancy (health) affect labor productivity enhancement; it is different from a vocational school. Consequently, the number of unemployed vocational school graduates is high.

Keywords: *Fiscal policy, Labor productivity, Socio-economic*

JEL Classification: E62, I25, I15, J01

INTRODUCTION

Limited resources require government intervention to allocate functions through fiscal policy, optimize production issues to meet community needs, and enhance productivity. According to Gopinath et al. (2017), resource and capital misapplication will decrease productivity. One model of fiscal policy considered to enhance productivity is fiscal decentralization. Fiscal decentralization positively correlates with productivity. The stronger fiscal decentralization (federalism) is implemented, the more productivity increases (Dougherty & McGuckin, 2008; Blöchliger & Égert, 2013; Song et al., 2018). However, according to Brehm (2013), fiscal decentralization does not directly affect productivity but the incentive scheme. That scheme impacts local government expenditure to improve government investment conditions that will increase productivity (Kalyvitis & Vella, 2011; Bronzini & Piselli, 2009).

Government investment is used to fund education and health care, funded through transfer funds, both general (General Allocation Funds or DAU) and specific transfers (Special Allocation Funds or DAK). The increasing financing of both sectors is essential, and its factor directly influences labor productivity (Rivera & Currais, 2004a;

Arshad & Malik, 2015a). Therefore, the government has made the financing of these two sectors a priority. The education sector allocates a minimum of 20 % of the total in the State and Local Government Budget, while the allocation for the health sector is at least 5 %.

Although education and health sector budgets have been set in stone and implemented for decades, their effect on education performance does not seem to show a good result, as indicated by the average national school duration of only 8.3 years in 2019. Many Indonesians have not completed junior high school (SMP), even though sufficient funds have been allocated in the State Budget (APBN) and Regional Budget (APBD). The production level is relatively low since elementary school graduates dominate the education profile.

The relationship between education sector financing and labor productivity has a strong correlation. The more financing increases, the more the quality of human resources will improve and make them more productive (Fadilah et al., 2018; Appiah, 2017; Annabi et al., 2011). Health sector financing influences productivity enhancement, as found by Rivera & Currais (2004b) in Spain, Allen et al. (2014) in Tanzania, & Wang (2015a) in the OECD country. Determining the budget percentage in the education and health sector is intended to spur human resources quality improvement and avoid diverting funding allocations outside the basic service sector. The results of a study conducted by Corrado et al. (2009) showed that the output change rate per worker rises faster when the intangibles are calculated as capital, and the capital deepening is a source of labor productivity growth.

It is crucial to improve human resource quality to stimulate labor productivity in funding education and health sectors. In basic terms, an increase in the number of graduates from secondary schools and higher education is an indicator of enhancing the quality of human resources from the education perspective. Both general and vocational graduates are separated to compare labor productivity based on differences in graduate profiles since vocational school graduates are essential determinants of increasing productivity (Sala & Silva, 2012). Further, health indicators are seen in life expectancy and healthy living, and with government funding in the sector, access to health care will be more equitably spread to all populations.

The accumulation of physical capital formation does not merely determine the increase in total factor productivity. Yet, labor productivity cannot be denied as a manifestation of human capital. Instead, labor productivity is a source of medium to long-term economic growth, and both have causal relations (Korkmaz & Korkmaz, 2017; Nakamura et al., 2018). Aside from being a source of growth, labor productivity, accompanied by innovation, becomes the primary drive to a nation's economic competitiveness (Carayannis & Grigoroudis, 2012).

However, when referring to the latest report on global competitiveness compiled by the World Economic Forum (WEF), Indonesia's competitiveness is still lower than that of neighboring countries such as Singapore, Malaysia, and Thailand. Weak competitiveness as the effect of non-competitive labor productivity is one factor causing the low education level of the labor. Although the results of the Chansarn study (2010) supported the theory and previous studies that advances in education and technology are the most significant determinants in enhancing labor productivity growth.

The Central Bureau data (2018) showed that the over-15 aged working population, according to the highest educational level, was dominated by elementary-level graduates and lower. It was 50,458,493 people out of 124,004,950. Table 1 below shows a detailed description (Arham, 2019a).

Table 1. Over 15 years aged population with the highest education level and their past week activities, 2018

Level of Education	Total manpower	Unemployed
Elementary / Uneducated	50,458,493	16,766,881
Junior Level	22,424,728	1,131,214
Senior Level	22,336,556	1,930,320
Vocational	13,681,530	1,731,743
Academy / Diploma	3,450,541	220,932
University	11,653,102	729,601
Amount	124,004,950	22,510,691

Source: Central Bureau of Statistics, Processed (2019)

At the same time, the number of unemployed educated laborers remains high. The unemployed high school graduates are 1,930,320, and the vocational graduates are 1,731,743. In addition, 15,103,643 diplomas and university graduates are classified as open unemployment. Particularly relevant to the advent of migrant workers, in the future, this condition will be an issue in the absence of significant government attention. The foreign investment boom coupled with migrant non-skilled workers could generate social jealousy since our workforce continues to require employment.

However, the use of foreign labor cannot be ignored, as the numbers will continue to grow along with the increase in foreign investment and economic openness. Economic openness can improve energy productivity (Follmi et al., 2018; Abizadeh & Pandey, 2008). According to Cecchini & Lai-Tong (2011a), higher productivity through international openness is attributable to the indirect impacts associated with technology transfer. Nevertheless, according to Cecchini & Lai-Tong (2011b), increased productivity through international openness is caused by the indirect effects of technology transfer.

The result will be even worse because Indonesia's laborers are dominated by low education levels and work in the non-productive sector (agriculture). Consequently, their average income and labor-added value remain low (Gollin et al., 2014). The problem is that the agricultural sector still plays a supportive role in maintaining economic development alongside other sectors. Most of Indonesia's population still counts on the agriculture sector. Further, in most regions in Indonesia, the agricultural sector remains the formation of GRDP support. Concurrently, due to economic progress, people's per capita income uplift is increasingly affecting the growing needs for settlements, industrial areas, and other activities. Thus, land conversion continues. Finally, agricultural areas and proprietary are declining. The result is that agricultural land is increasingly limited. The fact that the number of workers in the agricultural sector is still high will eventually decrease the labor productivity in the agricultural sector. According to Restuccia et al. (2008), low labor productivity in the agricultural sector collectively contributes to and is responsible for impoverished countries. In contrast, in developed countries, the level of labor productivity in the agricultural sector is fairly high, as the impact of the declining number of workers in the agricultural sector shifted to the productive sector (industries).

It becomes apparent that changes in economic structure from the non-productive (traditional) sector to the productive sector (modern sector) or the industrial sector are additionally essential to create labor productivity and push a country out of the middle-income trap (Vivarelli, 2014). Overall, the industrial sector's share continues to increase year by year, even though the spread of industrial activity in Indonesia remains concentrated in Java. Future industrial activities are expected to continue to grow, and

the challenges are diverse. Particularly as regards, compared to other countries, labor productivity in the industrial sector is still low. While one of the important factors in growing the industrial sector is investment supported by productive labor, the industrial sector's share will stimulate labor productivity (Holman et al., 2008). This is in line with Yilmaz's (2016) view that the manufacturing industry sector drives the difference in labor productivity growth between countries.

The shift in economic structure will be pursued by a shift in the structure of the workforce to the industrial sector having a more secure level of wages. To improve the level of welfare, wages are an important variable stimulating labor productivity (Strauss & Wohar, 2004). Crucially, on the one hand, the wage level will improve workers' welfare. At the same time, on the other, a raise will increase the production input cost resulting in company profits deterioration. In other words, workers require a high wage raise. At the same time, companies (employers) expect insignificant increases to maintain profitability because when labor costs increase, employers will use fewer workers (Meer & West, 2016).

Based on the rationale mentioned above, this study investigates the determinants of labor productivity drivers in Indonesia. There are two reasons why this research is essential to do 1) Previous research on the factors that drive labor productivity shows that there are two poles with different findings. There is a gap between expectation and reality, such as a considerable amount of education funding, yet the progress indicators are not optimal, which results in low productivity. Thus, there are opportunities to develop studies related to these topics. 2) The variables that drive labor productivity are grouped into three categories, including decentralization and social and economic factors, where each factor is developed as a different variable from previous research. For example, the decentralization factor is divided into two variables; transfer of DAU and DAK, and social factors are proxied from the level of high school graduates by distinguishing general and vocational schools. The development of this model is a novelty as studies on this particular topic are still under-researched. This research aims to determine what factors are dominant in driving labor productivity in Indonesia statistically, as well as to identify the best policy model to encourage labor productivity so that Indonesia may become a high-income country.

METHODS

Data types and sources

The data in this study are secondary in the form of pooled data, the combination of time series data from 2014-2018, and cross-section data from 34 provinces in Indonesia. The macroeconomic, education and health performance data in each province were acquired from the Central Bureau of Statistics (BPS). At the same time, the DAU and DAK for basic service financing were taken from the Local Government Budget (APBD).

Empirical model

The factors assumed to affect labor productivity consist of fiscal policy through DAU and DAK and macroeconomic performance consisting: 1) Provincial Minimum Wage *(wages)*, assumed to have a strong impact on encouraging worker productivity enhancement. 2) The contribution of the agricultural and industrial sectors, in which the greater contribution of the agricultural sector, the lower labor productivity relatively. In contrast, labor productivity in the manufacturing industry sector is relatively higher. 3) Economic openness proxied from a province's year-to-date total exports and imports

divided by each province's total economic output. Higher economic openness of a region will foster labor productivity rivalry. 4) The education variable is measured by the education level of the population in each province, specifically the Senior and Vocational High Schools. The assumption is that a higher education level in each province stimulates labor productivity. 5) Health variables are measured from Life Expectancy, in which a person's high life expectancy illustrates their quality of life, thus maintaining their productivity. The equation model of this study can be written as follows.

$$Prod_{it} = \mu_0 + \mu_1 DAU_{it} + \mu_2 DAK_{it} + \mu_3 LnWage_{it} + \mu_4 SAgri_{it} + \mu_5 SIndus_{it} + \mu_6 LnOpeness_{it} + \mu_7 SHSGen_{it} + \mu_8 SHSVoc_{it} + \mu_9 LE_{it} + \varepsilon_{it}$$

Notes:
Prod = Labor productivity of each province (Rupiah)
DAU = DAU for each province (Rupiah)
DAK = DAKs for each province (Rupiah)
Wage = Minimum Wages for each Province (Rupiah)
Agricultural Share = Share of Agriculture Sector in each province (Percent)
Industry Share= Share of Manufacturing Sectors in each province
Eco Openness = Economic Openness of each Province (Ratio)
SHS (General) = Education level of Senior High Shool in each province (Persons)
SHS (Vocation) = Vocational Education Level of each province (Persons)
LE = Life Expectancy in each Province (Percent)

Data analysis method

For data analysis, based on the results technique's selection in panel data processing, statistical tests have been done under the Hausman and Chow test. Based on the Hausman and the Chow test results, the proper model was used through a fixed effect approach by weighting coefficient covariance white cross-section method. To get the Best, Linear, Unlimited Estimators (BLUE), the estimators need to be free from classical assumption violations, particularly multicollinearity, autocorrelation, and heteroscedasticity.

RESULTS AND DISCUSSION

Labor productivity is measured by the total GRDP of each province divided by the number of existing workers. This measurement, adopted by Freeman (2008), states that productivity is related to the efficient use of inputs in producing output (goods and/or services). Here, input means using labor for all business sectors, while the output is represented in the overall GRDP value. Based on the productivity calculation results and mapping, it is clearly observed that the average labor productivity *(GDP Workers)* is relatively low, with merely about six provinces having higher averages, as shown in Table 1.

Based on the mapping in Table 1, provinces with high labor productivity are DKI Jakarta, East Kalimantan, North Kalimantan, Riau, Riau Islands, and West Papua. Observing the economic characteristics of these provinces, their economic *share* is assisted by the non-agricultural sector (trade, services, industry, and mining). DKI Jakarta is the most productive province since the economic structure of the capital province is dominated by trade and services, with the workforce's education level mostly above high school graduates (62%), while the province is classified as the industrial area in Riau Islands Province. Meanwhile, East Kalimantan, North Kalimantan, Riau, and West Papua are dominated by the mining sector. The rest are

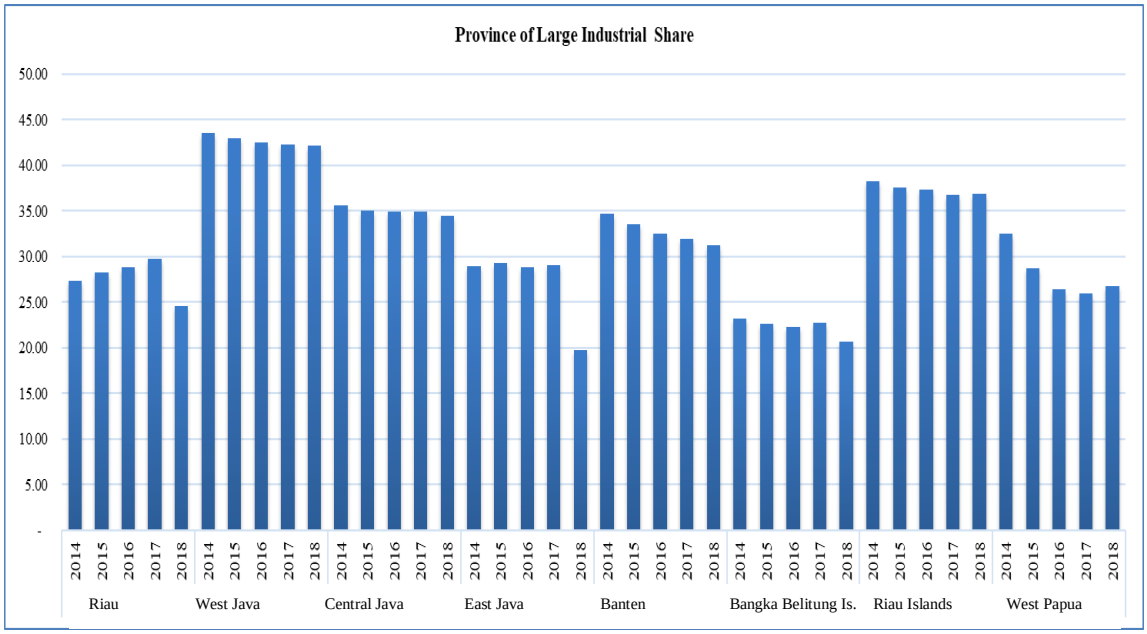
provinces relying on the agricultural sector, and East Nusa Tenggara Province has the lowest productivity level; its industrial sector share is 1.2 % of the average per year (Arham, 2019b).

Table 2. Labor productivity (GDP Workers) of each province in Indonesia

Province	Productivity of Labor (GDP Workers)
Aceh	53.533,14
North Sumatra	76.213,68
West Sumatra	68.037,09
Riau	165.121,93
Jambi	83.071,12
South Sumatra	75.329,85
Bengkulu	45.846,24
Lampung	57.190,00
Riau Islands	145.429,49
Bangka Belitung Islands	74.443,43
Banten	81.372,84
DKI Jakarta	337.842,57
West Java	68.320,02
Central Java	54.567,15
D.I. Yogyakarta	46.274,09
East Java	76.467,30
West Kalimantan	57.031,57
Central Kalimantan	72.709,99
South Kalimantan	63.366,74
East Kalimantan	287.232,16
North Kalimantan	258.957,76
North Sulawesi	76.938,39
Central Sulawesi	71.387,28
South Sulawesi	81.919,53
Southeast Sulawesi	73.151,87
Gorontalo	48.102,63
West Sulawesi	45.500,96
Bali	61.886,01
West Nusa Tenggara	41.930,54
East Nusa Tenggara	26.558,29
Maluku	52.244,72
North Maluku	48.584,37
Papua	89.876,38
West Papua	145.825,84

Source: Central Bureau of Statistics (BPS), processed data results (2019)

The assumptions above imply that the regions with economic sectors supported by the manufacturing industry and other non-agricultural sectors will be far more productive than those depending on the agricultural sector. However, this premise could not be fully applicable in the three provinces in Java, including West Java, Central Java, and East Java. Observing the economic structure of these provinces, the agricultural sector share is relatively declining temporarily, and the manufacturing sector share is increasing on average between 20 to 30 percent, as shown in Figure 2. However, there are four regions outside Java, which are industrial areas, such as Riau (Oil and Gas Industry), Bangka Belitung (Mining Industry), Riau Islands (Manufacturing Industry), and West Papua (Oil and Gas Industry).



Source: Central Bureau of Statistics (BPS), processed data results (2019)

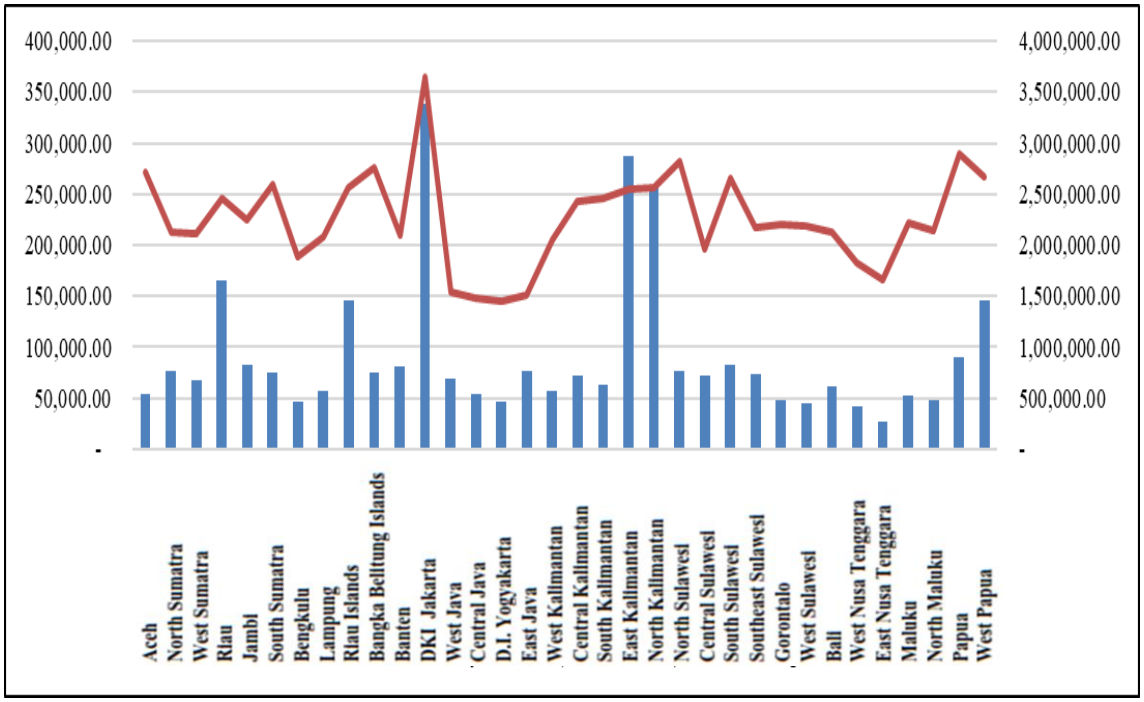
.**Figure 1.** The province with a high industrial sector share

This means that the three provinces (West Java, Central Java, and East Java) should not considerably differ from the labor productivity level of the Riau Islands, as seen in the mapping results in Table 1. The three provinces with large populations have relatively low labor productivity, though the industrial sector has expanded rapidly compared to other provinces outside Java. Thus, it can be assumed that the three regions, including Banten Province, have actually been going through a process of changing the economic structure, along with the shift of the workforce structure from the agricultural to the non-agricultural sector.

This condition is anomalous. Generally, in the GRDP process, in which the agricultural sector highly contributes, relatively lower labor productivity is not identified in the developed industrial sector. According to Nurske in Jhingan (2004) low productivity results in low income, delivering helplessness (poverty). Therefore, provinces with high poverty levels are regions leaning on the agricultural sector, while the industrial and service sectors are very limited.

Related to wage rates, as the Provincial Minimum Wage (UMP) suggested, it appears that the three provinces on Java Island apply lower rates compared to the provinces outside Java (notice Figure 3). Even though some regions outside Java with minimum natural resources, the non-processed agriculture sector is a leading sector. In fact, the industrial sector is very limited, which is actually the wage of their workers is lower than that in West, Central, and East Java.

There are two anomalous issues in West, Central, and East Java, low labor productivity and wages set by the government, even though these three provinces' economic structure changes work well. This means changes in economic structure are not in line with the assumptions of the theory proposed by Chenery & Syrquin (1975) that the process of structural transformation occurs when the share of agriculture in output decreases along with the increasing share of the non-agricultural sector (secondary and tertiary) and is followed by shifting the workforce structure to a more productive sector that can increase income per capita.



Source: Central Bureau of Statistics (BPS), processed data results (2019)

Figure 2. Comparison between wages and labor productivity levels

Figure 3 provides clear information that provinces outside Java provide higher wages, even though in most of them, the workers' wages do not align with their productivity levels, especially those in Eastern Indonesia. Ideally, high wages are positively correlated with productivity, such as in Riau Province, Riau Islands, DKI Jakarta, East Kalimantan, and North Kalimantan.

Factors driving labor productivity in Indonesia

Table 3 shows that fiscal policy factors, proxied by the DAU and the DAK, do not all stimulate labor productivity, only DAU. Thus, the more DAU is given to the regions, the more it encourages the increase in labor productivity. However, the problem, in reality, is that DAU transfer is mainly used to pay employees, while the allocation to increase labor productivity through human development is limited. DAU is a form of government fund transfer to local governments allocated to equitably distribute financial capacity among regions to fund regional needs in implementing decentralization. The amount of DAU received by each region varies, depending on the width of the fiscal gap and the amount of basic allocation for employee salaries. The higher DAU a region receives implies that its revenue source originating from Local Own-source Revenue (PAD) is relatively small. Conversely, the smaller DAU received suggests that the region is increasingly self-reliant due to a high proportion of tax revenue-sharing and vast Local Own-source Revenue.

Of 34 provinces in Indonesia, most of them are remarkably dependent on the DAU, except for DKI Jakarta and East Kalimantan. However, the proportion of the main income sources of the two provinces is different. DKI Jakarta relies on Local Own-source Revenue, while East Kalimantan is assisted by tax revenue sharing and natural resource provision. The amount of the DAU, in addition to being self-sufficient, is influenced by the number of districts or cities in a province. The higher the number, the higher DAU they receive, such as West, Java, and East Java, North Sumatra, South Sulawesi, and Papua. During the research, DAU utilization more effectively encouraged labor productivity enhancement. Due to the utilization, local governments were given

the sovereignty to allocate pursuant to their preferences and priority in the regions with elasticity towards human quality improvement (Arham, 2013).

Table 3. Summary of regression results of factors driving labor productivity

Variable	Coefficient	Std. Error	t-Statistics
C	10,22350	0.505341	20,23090
DAU?	3.07E-08	8.85E-09	3.463458 ***
DAK	-1.71E-09	2.22E-09	-0.770971
Log (Wages?)	0.012102	0.003104	3.899143 ***
ShareAgri?	-0.018634	0.002565	-7.266174 ***
ShareIndus?	0.001358	0.000819	1,657363
Log (Openness?)	0.002793	0.001136	2.457730 **
Log (SHSGen?)	0.003396	0.001416	2.399102 **
Log (SHSVoc?)	0,000656	0,000876	0.749293
LE?	0.014628	0.007808	1.873480 *
Adjusted R-squared	0.996568		
F-statistics	1134,860		
Durbin-Watson stat	2.268921		

*Note: *** 1%, ** 5% and * 10%.*

Meanwhile, DAK does not leverage the labor productivity enhancement during the study. The weak influence of the DAK to enhance labor productivity because its designation is not only used to finance education and health but also for the broader designation. This is no longer its specialty adapted to the local characteristics (regional diversity). According to Usman et al. (2008), this weakness encourages labor productivity. There are a number of policies that actually require national uniformity but still provide room for non-uniformity.

On the other hand, some policies should provide room for differences due to diverse inter-regional conditions yet impose national uniformity for sectoral financing. In practice, local governments are passive recipients of DAK grants. The attitude of the local government towards the Fund allocation process indicates an appraisal that the Central Government is not transparent. In addition, inter-agency coordination and communication in the DAK management appear to be limited.

Furthermore, the proximate wage level of the Provincial Minimum Wage (UMP) significantly and positively correlates. This means that any increase in wages for workers will result in an enhancement in labor productivity. These results are generally consistent with previous studies, as found by Katovich & Maia (2018), Fatma et al. (2017), and Bester & Pull (2003). Wages correlate with labor productivity. Derived from maximizing profits theory, this corresponds to the basic theory of microeconomics, stating that both have a relationship between productivity and wages. Besides, in the neoclassical approach, higher labor productivity is reflected in higher wages (Nikulin, 2015). Thus, to enhance labor productivity in each region, wages need to be a concern to be adjusted by the government. The problem is to enhance labor productivity by increasing wage levels; companies (producers) will limit the demand for new labor (Meager & Speckesser, 2011), while the labor market will continue to grow. The government needs to think of two interests diametrically *trade-off*, in which workers are expected to be more productive to confront increasingly intense competition. At the same time, the government is obliged to maintain a conducive investment climate since investors could relocate industries to a more efficient and productive workforce.

In an agrarian country, more than half of the 34 provinces in Indonesia remain counting on the agricultural sector, and its products appear to be international trade commodities. Since agricultural products remain low value-added, exports of its

commodities are still raw goods. Consequently, worker productivity is low. The estimation results reinforce that statement; the agricultural sector share has a significant effect yet is negatively correlated. This suggests that the agricultural sector share increases with the formation of the economy and lessens labor productivity. It would be different when the agricultural sector is directed at downstream activities (on-farm). The industrialization of agricultural products will encourage product productivity in accordance with labor productivity. To undertake down streaming, various challenges face the provinces producing agricultural products, such as low accessibility, minimum supporting infrastructure, and limited markets.

The industrial sector's contribution does not affect labor productivity enhancement since the possibility of developing manufacturing industries is capital-intensive. The education level of the available workforce remains dominated by elementary school graduates who are less absorbed in the industrial sector requiring high skills. Therefore, it is necessary to strengthen the manufacturing industry sector, especially industries related to agricultural commodities. In their studies, Diao et al. (2017) showed that in successfully industrialized countries, there is a strong positive correlation between labor productivity growth in agriculture and employment share in the manufacturing sector. This means that labor productivity enhances as a result of industrialization; some agricultural sector workers shift to work in the manufacturing industry sector, thereby increasing farmer income as the share of employment in the agricultural sector decreases and the share of jobs in the manufacturing sector increases. Therefore, to strengthen the performance of the industrial sector, investment is certainly required because investment, on the other hand, can increase productivity (Negara and Adam, 2012). In addition, investment is urged to develop outside Java, particularly in Eastern Indonesia, to diminish regional disparities.

Increased investment simultaneously illustrates economic openness. The economic openness variable estimation results are significant and positively correlated to labor productivity; thus, the more open an area's economy, the more labor productivity increases. This finding is in line with the research conclusions of Miller & Upadhyay (2000) and Jiang (2011). Economic openness will stimulate competition among workers, driven by investment to absorb an immense workforce. Local workers and workers outside the region (including foreigners) offer the labor market. This condition will result in the competition level, affecting productivity concurrently.

Workers' productivity can be driven if the education sector develops, assisted by sufficient funding. Further, it can complete the nine-year compulsory education program; even if necessary, compulsory education could be up to 12 years. It is assumed that increasing government spending to finance the education sector, both formal and informal, will stimulate parents to send their children to higher levels, such as high schools and colleges, since higher education levels influence productivity (Alvi & Ahmed, 2014a; Arshad & Malik, 2015b). It is illustrated from the estimation results that secondary school education is positively correlated and significantly increases labor productivity. The increasing number of public high school graduates will enhance labor productivity.

In contrast, vocational school graduates have no effect in labor productivity. They should strengthen labor productivity since they possess more technical skills compared to public school graduates. This finding clarifies the condition of unemployment in Indonesia, in which the open unemployment level of Vocational High School graduates is entirely major. The quality of vocational school graduates remains low since the curriculum does not meet the labor market need, and the limited industry can absorb the

workforce of vocational school graduates. Practices and pieces of training obtained by vocational school students remain minor compared to the theory, the findings of Sala & Silva (2013) in their studies, the productivity of vocational school graduates grows if the training portion is raised. Weak ability 'skills' from vocational school graduates cause additional costs for the industry to train them when employed. Dong & Manning (2017) mentioned many ways to productivity enhancement by increasing skills through the assistance of government investment in training and apprenticeships and by expanding vocational training by adopting the German model.

Meanwhile, the health variable proxied from Life Expectancy has a positive and significant effect on productivity. A country's population's availability of appropriate health care may bear better health, thus strengthening a country's human capital and contributing to economic growth through enhanced productivity (Wang, 2015b). In addition, higher life expectancy will trigger the transition to sustainable income growth supported by productivity level (Cervellati & Sunde, 2009; Alvi & Ahmed, 2014b). Even though basically productivity decreases as someone gets older, the results of the Skirbekk study (2003) found individual work performance declines at around 50 years of age. It is contrary to the wage raise for almost a lifetime. However, productivity decimation at age happens merely in jobs requiring problem-solving, learning, and speed of adjustment, in contrast with crucial experience and verbal ability.

CONCLUSION AND RECOMMENDATION

Conclusion

Several important points can be used as essential conclusions to increase labor productivity in Indonesia; firstly, fiscal transfers from DAU and DAK showed that only DAU affects increasing labor productivity in Indonesia. While DAK does not affect improving labor productivity, this is due to the non-specificity of DAK distribution for particular fields directly related to productivity gains. Second, workers' wages have a positive and significant effect on labor productivity; an increase in employees' salaries through annual Provincial Minimum Wage (UMP) adjustments will motivate workers, particularly those in the formal sector, to enhance their productivity. Third, the agriculture sector's contribution has a negative and significant impact on labor productivity, implying that the higher the share of the agricultural sector in the formation of Gross Regional Domestic Product of each province, the lower the labor productivity. Fourth, economic openness substantially impacts increasing labor productivity; the more open a region's economy is, the higher the labor force competitiveness. Fifth, while general high school and vocational high school education levels are both increasingly promoting an improvement in labor productivity, the estimation findings reveal that only general high school education can encourage a significant increase. In contrast, vocational school education does not affect labor productivity. Sixth, the life expectancy factor has a positive and considerable effect on improving labor productivity in Indonesia; increasing the average life expectancy of Indonesian people with good health insurance will increase their productivity.

Recommendation

It is recommended several essential points, including; first, DAK does not have the effect of boosting labor productivity in Indonesia; the central government needs to encourage local governments to strengthen financing and prioritize funds from DAK to sectors that can accelerate human quality improvement (labor productivity). Second, workers' wages can boost labor productivity; therefore, wage increases must be made

every year, yet it must consider the area's investment continuity. Third, since the share of the primary sector has a negative relationship with labor productivity, it is necessary to continue to stimulate the acceleration of regional economic transformations and a shift in the workforce structure. Fourth, the industrial sector's contribution does not affect labor productivity in Indonesia. Hence, the government should improve the industrial structure by encouraging labor-intensive processing industries and utilizing regional potential. Fifth, the level of vocational school education does not affect productivity improvement; therefore, the vocational education system should reform the vocational education system by increasing the proportion of training, adjusting the curriculum and the labor market, as well as regional potential.

REFERENCES

Abizadeh, S. & Pandey, M. (2008). Trade openness, structural change and total factor productivity, *International Economic Journal, 23*(4), 545 – 559.

Allen, S. Badiane, O. Sene, L. & Ulimwange, J. (2014). Government expenditures, health outcomes and marginal productivity of agricultural inputs: The case of Tanzania', *Journal of Agricultural Economics*, *65*(3), 637 - 622.

Almeida, R., & Fernandes, A. M. (2008). Openness and technological innovations in developing countries: Evidence from firm-level surveys. *Journal of Development Studies*, *44*(5), 701 - 727.

Alvi, S., & Ahmed, A. M. (2014). Analyzing the impact of health and education on total factor productivity: A panel data approach. *Indian Economic Review*, *49*(1), 109-123.

Annabi, N., Harvey, S., & Lan, M. (2011). Public expenditures on education, human capital and growth in Canada: An OLG model analyses. *Journal of Policy Modeling, 33*(6), 852 - 865.

Appiah, E. (2017). The effect of education expenditure on per capita GDP in developing countries. *International Journal of Economics and Finance, 9*(10), 136 - 144.

Arham, M. A. (2013). *The effect of fiscal decentralization policy on sectoral shifts and inequality between regencies/cities in Sulawesi and Java [Unpublished Doctoral Dissertation]*. Bandung: Padjadjaran University.

Arham, MA. 2019. Driving factors for labor productivity and challenges in Indonesia, Fiscal Policy Agency, Unpublished, Ministry of Finance, Jakarta.

Arshad, M. N. M., & Malik, Z. A. (2015). Quality of human capital and labor productivity: A case of Malaysia. *International Journal of Economics, Management and Accounting*, *23*(1), 37 - 75.

Bestera, H. & Petrakis, E. (2003). Wages and productivity growth in a competitive Industry, *Journal of Economic Theory*, *109*(1), 52 – 69.

Blöchliger, H., & Égert, B. (June 3rd, 2013). Decentralization and economic growth - part 2: The impact on economic activity, productivity and investment. *OECD Working Papers on Fiscal Federalism No. 15*. doi:10.1787/5k4559gp7pzw-en.

Brehm, S. (2013). Fiscal incentives, public spending, and productivity - county-level evidence from a Chinese province. *World Development*, *46*(6), 92 - 103.

Bronzini, R. & Piselli, P. (2009). Determinants of long-run regional productivity with geographical spillovers: the role of R & D, human capital and public infrastructure, *Regional Science and Urban Economics*, *39*(2), 187 – 199.

Carayannis, E., & Grigoroudis, E. (2012). Linking innovation, productivity, and competitiveness: Implications for policy and practice. *Journal of Technology Transfer*, *9*(2), 199 - 218.

Cecchini, L. & Lai-Tong, C. (2011). The links between openness and productivity in mediterranean countries, *Applied Economics, 40*(6), 685 – 697.

Cervellati, M., & Sunde, U. (2009). Life expectancy and economic growth: the role of the demographic transition. *Journal of Economic Growth*, *16*, 99-133.

Chansarn, S. (2010). Labor productivity growth, education, health and technological progress: A cross-country analysis. *Economic Analysis and Policy*, *40*(2), 249 - 261.

Chenery, H., & Syrquin, M. (1975). *Patterns of development, 1950-1970*. Oxford: Oxford University Press.

Corrado, C., Hulten, C. & Sichel, D. (2009). Intangible capital and US economic growth. *Review of Income and Wealth*, *55*(3), 661 - 685.

Diao, X., McMillan, M., & Wangwe, S. (2018). Agricultural labor productivity and industrialization: Lessons for Africa. *Journal of African Economies, 27*(1), 28–65.

Dong, S. X., & & Manning, C. (2017). Labor-market developments at a time of heightened uncertainty. *Bulletin of Indonesian Economic Studies*, *53*(1), 1 - 25.

Dougherty, S. M., & McGuckin, R. H. (2008). The effects of federalism on productivity in Chinese firms. *Management and Organization Review, 4*(1), 39 – 61.

Fadilah, F., Ananda, C. F. & Kaluge, D. (2018). A panel approach: How does the government expenditure influence human development index? *Journal of Economics and Development Studies, 10*(2), 130 - 139.Freeman, R. (2008). *Labor productivity indicators: Comparison of two OECD databases productivity differentials & The Balassa-Samuelson effect*. OECD Statistics Directorate.

Fatma, I. K. A., Kadir, S. A., Sariman, T. & Yuliana, S. (2017). The level of wage and labor productivity in hotel industry: an analysis, *Eurasian Journal of Economics and Finance, 5* (2), 36 - 50.

Föllmi, R., Fuest, A., de Meulen, P., Micheli, M. Schmidt, T. & Zwick, L. (2018) Openness and productivity of the Swiss economy. *Swiss J Economics Statistics*, 17.

Gollin, D. Lagakos, D. & Waugh, M. E. (2014). The agricultural productivity gap. *The Quarterly Journal of Economics, 129*(2), 939 - 993.

Gopinath, G., Kalemli-Özcan, S., Karabarbounis, L., & Villegas-Sanchez, C. (2017). Capital allocation and productivity in South Europe. *The Quarterly Journal of Economics, 132*(40), 1915 - 1967.

Holman, C., Joyeux, B., & Kask, C. (2008). Labor productivity trends since 2000 by sector and industry. *Monthly Labor Review*, *7*(1), 64-82.

Jhingan, M. L. (2004). *Economic development and planning*. Jakarta: PT. Raja Grafindo Persada.

Jiang, Y. (2011). Understanding Openness and Productivity Growth in China: An Empirical Study of The Chinese Provinces, China Economic Review, *22*(3), 290 – 298.

Kalyvitis, S., & Vella, E. (2011). Public capital maintenance, decentralization, and US productivity growth. *Public Finance Review*, 39(6), 784-809.

Katovich, E. S. & Maia, A. G. (2018). The relation between labor productivity and wages in Brazil: a sectoral analysis, *Nova Economia, 28* (1), 7 – 38.

Korkmaz, S. & Korkmaz, O. (2017). The relationship between labor productivity and economic growth in OECD countries. *International Journal of Economics and Finance*, *9*(5), 71 - 76.

Meager, N., & Speckesser, S. (2011). *Wages, productivity and employment: A review of theory and international data*. Brighton: Institute for Employment Studies.

Retrieved online from https://www.employment-studies.co.uk/resource/wages-productivity-and-employment-review-theory-and-international-data.

Meer, J. & West, J. (2016). Effects of the minimum wage on employment dynamics. *Journal of Human Resources*, *51*(2), 500 - 522.

Miller, S. M., &. Upadhyay, M. P. (2000). The effects of openness, trade orientation, and human capital on total factor productivity. *Journal of Development Economics, 63*(2), 399 - 423.

Nakamura, K., Kaihatsu, S. & Yagi, T. (2018). Productivity improvement and economic growth. *Working Paper, No.18-E-10*. Retrieved online from https://www.boj.or.jp/en/research/wps.

Negara, S. D., & Adam, L. (2012). Foreign direct investment and firms' productivity level: Lesson learned from Indonesia. *ASEAN Economic Bulletin*, *29*(2), 116 - 127.

Nikulin, D. (2015). Relationship between wages, labor productivity and unemployment rate in New EU member countries. *Journal of International Studies, 8*(1), 31 - 40.

Restuccia, D., Tao, D., & Zhu. (2008). Agriculture and aggregate productivity: A quantitative cross-country analysis. *Journal of Monetary Economics, 55*(2), 234 - 250.

Rivera, B., & Currais, L. (2004). Public health capital and productivity in the Spanish regions: A dynamic panel data model. *World Development, 32*(5), 871 - 885.

Sala, H., & Silva, J. I. (2013). Labor productivity and vocational training: Evidence from Europe. *Journal of Productivity Analysis*, *40*(1), 31–41.

Skirbekk, V. (2003). Age and individual productivity: A literature survey. *MPIDR Working Paper, WP 2003-028*. Rostock, Germany: Max Planck Institute for Demographic Research.

Song, M., Du, J., & Tan, K. H. (2018). Impact of fiscal decentralization on green total factor productivity. *International Journal of Production Economics*, *205*(11), 359 - 367.

Strauss, J., & Wohar, M. E. (2004). The linkage between prices, wages, and labor productivity: A panel study of manufacturing industries. *Southern Economic Journal*, *70*(4), 920 - 941.

Usman, S., Mawardi, M. S, Poesoro, A., & Suryahadi, A. (2008). *Mechanisms and use of special allocation funds (DAK)*. Jakarta: SMERU Research Institute.

Vivarelli, M. (2014). Structural change and innovation as exit strategies from the middle income trap. *IZA Discussion Papers 8148*. Bonn, Germany: Institute of Labor Economics (IZA). Retrieved online from https://ideas.repec.org/p/iza/izadps/dp8148.html.

Wang, F. (2015). More health expenditure, better economic performance? Empirical evidence from OECD countries. *The Journal of Health Care Organizations, Provision, and Financing, 52*, 1-5.

Yılmaz, G. (2016). Labor productivity in the middle income trap and the graduated countries. *Central Bank Review, 16*(2), 73 – 83.